

15	page 3, paragraph [0051]
16	page 4, paragraph [0056]
17	page 4, paragraph [0057]
18	page 3, paragraph [0051]; page 4, paragraph [0057]
19	page 9, paragraph [0128]
20	page 6, paragraph [0091]; page 9, paragraph [0128]
21	page 4, paragraph [0056]
22	page 4, paragraph [0057]
22	page 6, paragraph [0091]; page 9, paragraph [0128]

None of the above-made amendments to the claims constitute new matter under 35 U.S.C. § 132.

PRIOR ART REJECTIONS

Claims 1-6 and 8 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,846,695 to Iwata et. al. for the reasons set forth on page 2 of the Office Action.

In response, Applicants submit that the present invention is directed to cleaning compositions for the removal of etch residues from integrated circuits *using copper materials*. See claims 1-20.

Respectfully, Iwata does not disclose the invention claimed in the present invention, Iwata *teaches away* from using the claimed invention. The claimed invention is generally to a composition for removing residues from copper containing substrates containing choline, water, and an organic solvent. Iwata, on the other hand, describes a photoresist remover comprising 0.01 to 20% by weight of a quaternary ammonium hydroxide, 1 to 80% by weight of a nucleophilic amine, 0.5 to 20% by weight of a sugar and/or a sugar alcohol, and water in the remaining amount. See *Abstract*, Maloney Decl. ¶ 5, attached hereto as Exhibit 1. A critical aspect of this disclosure is the use of a sugar or sugar alcohol. Maloney Decl. ¶ 5. The application states that “[w]hen the concentration of the sugar or the sugar alcohol is lower than the specified range, corrosion of the wiring material cannot sufficiently be prevented.” Col. 4, lines 25-28. *None* of the formulations disclosed or claimed in the present application contain a sugar or sugar alcohol, nor are they intended to contain a sugar or sugar alcohol. Furthermore, these cannot be considered organic solvents as disclosed and claimed in the present invention because one of skill in the art would clearly understand that the sugars or sugar alcohols disclosed in Iwata could not be substituted into the formulations of the present application. Maloney Decl. ¶ 5. The sugars or sugar alcohols would impede the capability of the formulation as a remover and due to the properties of the

sugars or sugar alcohols, it is more likely that additional residues would be deposited by such formulations. Maloney Decl. ¶ 6. In addition, such sugar or sugar alcohol substituted formulations would be too viscous to use for the purpose intended in the present application. Maloney Decl. ¶ 7.

Because one of skill in the art would know that the formulations of the present application do not include or contemplate the sugars or sugar alcohols of Iwata, such skilled artisans would recognize that Iwata teaches away from the claims of the present application because if there is no sugar or sugar alcohol, according to Iwata, corrosion will occur. See id. at col. 4, lines 25-28 ("When the concentration of the sugar or sugar alcohol is [less than 0.5%], corrosion of the wiring material in the circuit cannot sufficiently be prevented.") Consequently, Iwata *teaches away* from the use of a cleaning composition that does not contain a sugar or sugar alcohol and teaches away from the claimed invention of the present application.

In addition, Iwata fails to address the removal of residues from substrates containing copper. See '695 patent, col. 4, lines 31-39. Examples of the substrates used in the process include "silicon, polysilicon, silicon oxide film, aluminum, aluminum alloys, titanium, titanium-tungsten, titanium nitride, and tungsten," as well as compound semiconductors such as "gallium arsenic, gallium-phosphorus, and indium-phosphorus" and glass substrates. *Id.* at lines 35-39. Copper substrates and copper-containing alloys are conspicuously absent from this list. Interestingly, this is despite the fact that Iwata *mentions* that prior art cleaning methods are corrosive to both aluminum *and copper*. See *id.* at Col. 1, lines 38-41. Therefore, Iwata was aware of the corrosion problems inherent in copper materials used in integrated circuits, yet they chose not to disclose or claim the use of their cleaning solution on such materials.

Iwata does not claim, disclose or even suggest the removal of etch residues from integrated circuits using copper materials. Therefore, Iwata does not disclose the presently claimed invention.

Furthermore, claims 2-9 depend from independent claim 1. Just as it is axiomatic that if claim 1 is not infringed, dependent claims 2-9 can not be infringed, *see, Minnesota Mining and Mfg. Co. v. Chemque Inc.*, 64 U.S.P.Q.2d 1270, 1275, *Wahpeton Canvas Co. v. Frontier, Inc.*, 870 F.2d 1546, 1553, 10 U.S.P.Q.2d 1201, 1208 (Fed. Cir. 1989), it is also axiomatic that if claim 1 is not anticipated by a reference, dependent claims 2-9 also can not be anticipated by that reference. Therefore, Applicants respectfully ask that Examiner withdraw his rejection of dependent claims 2-9.

As Iwata does not disclose the presently claimed invention, the present claims are not anticipated. Accordingly, it is respectfully requested that the Examiner withdraw the rejection under 35 U.S.C. §102(b) over Iwata. Moreover, as Iwata fails to even suggest the

presently claimed cleaning of integrated circuits with copper materials, the present claims are not obvious over the cited references.

Claims 7 and 9 were rejected under 35 U.S.C. §103(a) as being unpatentable over Iwata *et. al.* in view of U.S. Patent No. 5,798,323 to Honda ("323 patent") for the reasons set forth on page 3 of the Office Action.

In response, Applicants submit that the present claims are directed to cleaning compositions for the removal of etch residues from integrated circuits *using copper materials*. See claims 1-20. Applicant's cleaning composition is composed of *choline*, *water*, and an *organic solvent*. See published app., para. [0057]. Optionally, the composition *may include a corrosion inhibitor*. See *id.*

In contrast, Iwata teaches a removing agent composition comprising 0.01% to 20% by weight quaternary ammonium hydroxide, 1-80% by weight of a nucleophilic amine, and 0.5 to 20% by weight of a *sugar and/or a sugar alcohol*, with the balance water. See '659 patent, col. 2, lines 50-59. "When the concentration of the sugar or sugar alcohol is [less than 0.5%], corrosion of the wiring material in the circuit cannot sufficiently be prevented." See *id.* at col. 4, lines 25-28. Consequently, Iwata *teaches away* from the use of a cleaning composition that does not contain a sugar or sugar alcohol. Furthermore, as discussed above, Iwata does not suggest that his removing composition is useful for cleaning copper materials. Therefore, Iwata does *not teach* or suggest the presently claimed cleaning solution (which does not contain sugar or a sugar alcohol) *for copper materials*, and fails to provide any motivation to one of ordinary skill in the art to obtain the presently claimed invention. Iwata specifically *teaches away* from using any formulation that contains no sugar or sugar alcohol, such as *all* the formulations of the present invention. Therefore, Iwata cannot render any of the claims of the present invention anticipated or obvious.

Honda does nothing to overcome the deficiencies of Iwata. Honda teaches a non-corrosive stripping and cleaning compound comprising 5-50% of an organic solvent, 10-90% alkanolamine, 0.1-4% of a corrosion inhibitor, and 0.1-40% water. '323 patent, col. 4, lines 40-67 to col. 5, lines 1-3. Honda *does not* teach or suggest the removal of sugar and/or sugar alcohols from Iwata's cleaning composition. Therefore, even if one of ordinary skill in the art combined the organic solvent and anti-corrosive agent from Honda with Iwata's composition, as suggested by the examiner, the resulting combined claim would still teach a solution that contains sugar and/or sugar alcohol *as a necessary ingredient*. See '659 patent, col. 4, lines 23-31. Applicant's cleaning composition does not contain sugar or sugar alcohol. Thus, Iwata and Honda are both outside the scope of the claims of the present invention, and fail to teach or suggest the presently claimed invention. Furthermore, neither Honda nor Iwata contain any motivation to combine the references. It is axiomatic that "[t]he showing of a motivation to combine must be clear and particular, and it must be supported by actual

evidence." *Teleflex, Inc. v. Ficosa North Am.*, 299 F.3d 1313, 63 U.S.P.Q.2d 1374 (Fed. Cir. 2002)(citing *In re Dembicza*k, 175 F.3d 994, 999, 50 U.S.P.Q.2d 1614, 1617 (Fed. Cir. 1999)). In fact, Iwata teaches away from combining with Honda because the Honda formulations do not contain sugars or sugar alcohols and according to Iwata, such formulations would result in corrosion. *Accord*, Maloney Decl. ¶ 8.

Therefore, as Iwata and Honda, whether taken alone or in combination, do not teach or suggest the presently claimed invention, the present claims are not obvious. Accordingly, it is respectfully requested that the Examiner withdraw the rejection of claims 6 and 8 under 35 U.S.C. § 103(a).

CONCLUSION

Applicants respectfully request that the above-made amendments and remarks be entered and made of record in the file history of the present application. Claims 1-20 fully meet all statutory requirements for patentability. Withdrawal of the Examiner's rejections, allowance and action for issuance are respectfully requested.

Applicants thus submit that the entire application is now in condition for allowance, early notice of which would be appreciated. Should the Examiner not agree with the Applicants' position, then a personal or telephonic interview is respectfully requested to discuss any remaining issues and expedite the eventual allowance of the application. Applicants respectfully request that the Examiner call James S. McDonald at 650-849-7631 if any questions or issues remain.

A fee of \$54 is believed due for the claim changes of this amendment, an Amendment Fee Transmittal sheet is included herewith in duplicate. Should any additional fees be required, however, please charge such fees to Pennie & Edmonds LLP Deposit Account No. 16-1150.

Respectfully submitted,

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**APPENDIX A:
CHANGES TO CLAIMS UPON ENTRY
OF THE AMENDMENT UNDER 37 C.F.R. § 1.111
FILED MARCH 24, 2003**

**U.S. PATENT APPLICATION DIVISIONAL OF SERIAL NO. 10/007,134
(ATTORNEY DOCKET NO. 8317-123-999)**

3 (Amended). The composition of claim 2 in which the composition comprises from about 10 percent by weight to about 80 percent by weight of [the] water.

4 (Amended). The composition of claim 3 in which the composition comprises from about 20 percent by weight to about 80 percent by weight of [the] organic solvent.

APPENDIX B:
CLAIMS AS PENDING UPON ENTRY
OF THE AMENDMENT UNDER 37 C.F.R. § 1.111
FILED MARCH 24, 2003

**U.S. PATENT APPLICATION DIVISIONAL OF SERIAL NO. 10/007,134
(ATTORNEY DOCKET NO. 8317-123-999)**

1 (Amended). A composition for removal of etch residues from integrated circuits using copper materials, which comprises a choline compound, water and an organic solvent.

2. The composition of claim 1 in which the composition from about 10 percent by weight to about 50 percent by weight of the choline compound.

3 (Amended). The composition of claim 2 in which the composition comprises from about 10 percent by weight to about 80 percent by weight of water.

4 (Amended). The composition of claim 3 in which the composition comprises from about 20 percent by weight to about 80 percent by weight of organic solvent.

5. The composition of claim 1 in which the choline compound comprises choline hydroxide, choline bicarbonate or choline chloride.

6. The composition of claim 5 in which the choline compound is choline hydroxide.

7. The composition of claim 5 in which the organic solvent comprises propylene glycol, dimethyl sulfoxide, monoethanolamine, or diglycolamine.

8. The composition of claim 1 in which the composition additionally comprises hydroxylamine.

9. The composition of claim 1 in which the composition additionally comprises a corrosion inhibitor.

10 (new). A composition for the removal of etch residues from integrated circuits using copper materials, in which the composition comprises from greater than 20% to about 50% by weight choline, water, and an organic solvent.

11 (new). The composition of claim 10 in which the composition comprises from about 10 percent by weight to about 80 percent by weight of water.

12 (new). The composition of claim 11 in which the composition comprises from about 20 percent by weight to about 80 percent by weight of organic solvent.

13 (new). The composition of claim 10 in which the choline compound comprises choline hydroxide, choline bicarbonate or choline chloride.

14 (new). The composition of claim 13 in which the choline compound comprises choline hydroxide.

15 (new). The composition of claim 13 in which the organic solvent comprises propylene glycol, dimethyl sulfoxide, monoethanolamine, or diglycolamine.

16 (new). The composition of claim 10 in which the composition additionally comprises hydroxylamine or hydroxylamine salt.

17 (new). The composition of claim 10 in which the composition additionally comprises a corrosion inhibitor.

18 (new). A composition for the removal of etch residues from integrated circuits using copper materials, in which the composition comprises from about 10% by weight choline to about 50% by weight choline, water, and a glycol selected from the group consisting of ethylene glycol, ethylene glycol alkyl ether, diethylene glycol alkyl ether, triethylene glycol alkyl ether, propylene glycol, and propylene glycol alkyl ether.

19 (new). The composition of claim 18 where the choline comprises choline hydroxide and the glycol comprises propylene glycol.

20 (new). The composition of claim 19 in which the composition comprises about 22.5% by weight choline hydroxide, about 50% by propylene glycol, and about 27.5% by weight water.

21 (new). The composition of claim 12 in which the composition additionally comprises from about 2 to about 12% by weight of hydroxylamine or hydroxylamine salt.

22 (new). The composition of claim 21 in which the composition additionally comprises from about 0.5 to about 5% by weight of a corrosion inhibitor.

23 (new). The composition of claim 4 in which the choline is choline hydroxide and the organic solvent is propylene glycol.